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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,168	01/26/2004	Alexander Kastalsky		7851

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EXAMINER

LOUIE, WAI SING

ART UNIT PAPER NUMBER

2814

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,168

Applicant(s)

KASTALSKY ET AL.

Examiner

Wai-Sing Louie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 11, 12, 18 and 22-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13-17 and 19-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Applicant's election without traverse of Group I, claims 1-10, 13-17, and 19-21, in the reply filed on 5/3/05, is acknowledged. It is suggested that non-elected claims be canceled in the response to this Office Action.

Claim Objections

Claims 1 and 14 are objected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- In claims 1, "the axis of the nanotube being essentially normal to one of the edges of the conductive layer" is claimed. However, nanotube is a soft material and it will bend if it is not supported. Thus, the axis of the nanotube will not be normal to the edge of the conductive layer.
- In claim 14, with the same reasoning as claim 1 above, the nanotube will not be normally to the substrate plane.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-n (in so far as they are understood) are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamoto (US 6,891,320).

With regard to claims 1, 7, and 13, Nakamoto discloses a field emission cold cathode device (col. 3, line 39 to col. 11, line 34 and fig. 3), comprising:

- Two electrodes 22 and 24 laterally shifted from each other (col. 4, 112) on a non-conductive substrate (col. 4, line 21);
- The first electrode 22 includes a conductive layer 42 and a nanotube on top of it, where the axis of the nanotube 44 being essentially normal to one of the edges of the conductive layer and protrudes beyond the one of the edges of the conductive layer 42 (col. 5, lines 27-28 and fig. 3);
- The second electrode 24 includes a conductive layer 46 placed on the substrate next to the one of the edges of the first conductive layer 42 and on a plane below the plane of the first electrode 42, so that the nanotube 44 is located above and protrudes into the area of the second electrode 24 (fig. 3).

With regard to claims 4-6, 8, and 19 Nakamoto discloses the nanotube is a single walled nanotube (col. 6, line 29) and the nanotube is a metal type (col. 6, lines 51-54).

With regard to claims 9-10 and 20-21, Nakamoto discloses the additional metal layer in the nanotube is made from a material with low work function and additional metal layer is made from Cs (col. 6, lines 13-26).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-n are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamoto (US 6,891,320).

With regard to claims 2-3, Nakamoto discloses the nanotube field emission device operates in a vacuum discharge space 33 (col. 4, lines 30-32 and fig. 1), but does not disclose placing the unit in a vacuum chamber. Although, Nakamoto does not specifically state that the unit is placed in a vacuum chamber. However, since Nakamoto discloses the claimed structure, it would have been obvious that such a structure of the claimed semiconductor device results in a vacuum chamber. Nakamoto discloses the nanotube field emission device is formed through helium gas atmosphere (col. 6, lines 60-61).

With regard to claims 14 and 16-17, in addition to the limitations disclosed in claim 1, Nakamoto also discloses:

- A small pad (array) of nanotube catalytic material 48 is disposed on the second conductive layer 46 in close proximity to one of the edges of the first conductive layer 42 (fig. 6);
- The nanotube material is 15 nm or less (col. 5, lines 42-49);

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- Nakamoto do not disclose the height of the nanotube 48 is slightly below the plane of the first conductive layer 42. Since the applicant has not established the criticality of the height stated and since these the heights are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).


With regard to claim 15, Nakamoto discloses the catalytic material is Ni (col. 6, line 19).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Wsl
July 12, 2005.